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SHORTLEAF PINE STANDS FIVE YEARS AFTER
SEEDFALL ON PREPARED SITES

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SOUTHERN FOREST EXPERIMENT STATION

Five years after an excellent seed crop, north Arkansas sites on which a seedbed had been prepared with a rotary brushcutter had seven times as many shortleaf pine seedlings as untreated check areas. Prescribed burning or chemical treatment was considerably less effective.

The beds, under a pine overstory, were prepared in October, just prior to seedfall. They were in four contiguous blocks, with treatments—brushcutter, fire, chemicals, or check—randomly replicated in each block on 0.5-acre plots. All plots had a heavy stand of hardwood brush.

The brushcutter was one of several makes now on the market. It readily mowed vegetation up to 3 inches in diameter at the root-collar, and it scarified the soil surface without destroying litter and humus. Larger trees, both pine and hardwood, were left untreated on plots prepared by the brushcutter.

The chemical was propylene glycol butyl ether ester of 2,4,5-T (4 pounds acid equivalent per gallon), applied in a 16-pound ahg concentration in diesel oil. It was sprayed on the basal portions of all hardwoods less than 4 inches in diameter at breast height, and into frills on larger stems.

The burn was a backing fire that consumed the litter but did not destroy large hardwoods.

Check plots were left untreated.

Seedfall was extraordinarily heavy. An average of 477 thousand viable seeds per acre was estimated from traps placed on each plot. The range was from 202 thousand to 941 thousand seeds per acre.

RESULTS

At the end of the fifth growing season, the plots prepared with the brushcutter had more than 13,000 pine trees per acre, as compared to 4,500 on the chemically treated plots, 3,200 on the burned plots, and 1,800 on the checks (table 1). Differences in stocking between

Table 1.—Shortleaf pine and hardwood seedlings per acre, 5 years after seedbed treatment

Seedbed treatment	Shortleaf pine		Hardwood stocking
	Tree percent	Stocking	
		Number	Number
Brushcutter	2.9	13,312	4,988
Chemical	1.3	4,525	4,112
Burn	.4	3,212	5,900
Check	.4	1,788	5,475

treatments, as summarized in table 1, were significant at the 0.01 level.

Tree percent (yield of seedlings per hundred viable seeds thrown) after 5 years was best on the brushcutter plots. Like stocking, it is an indication of the effectiveness of initial seedbed preparation and total control of vegetation.

The distribution of the seedlings was clumpy. Even on the brushcutter plots, milacre stocking averaged no better than 70 percent. On the chemically treated and the burned plots the milacre stocking was 50 percent; on the check plots it was 30.

Beginning in the third year, heavy stands of hardwoods developed on all plots. Those on the brushcutter plots, though numerous, were concentrated near overstory trees that had not been killed by the machine. These patches contained relatively few pines, but the open areas were invaded by grasses, forbs, and vines that rapidly overtopped the pines. On the

other sets of plots the hardwood brush was more evenly distributed and invading plants less numerous. But regardless of the method of site preparation, by the fifth year pines on all plots needed release.

As the hardwoods were too small to be treated individually, and since prescribed burning would have killed the pines, some form of chemical spray appeared necessary. Because of the nature and distribution of the competing plants, chemical release would have been effected more easily on the brushcutter plots than on the others.

As a matter of general observation, seedbed preparation seems essential to the establishment of shortleaf pine regeneration in the Ozark Mountains. In the study reported here, the brushcutter was superior to prescribed burning or chemical treatment of undesirable hardwoods. Its effectiveness following a less spectacular seed year has not been tested.